

## **Appendix F. FCC WCDMA SAR Measurement Procedures**

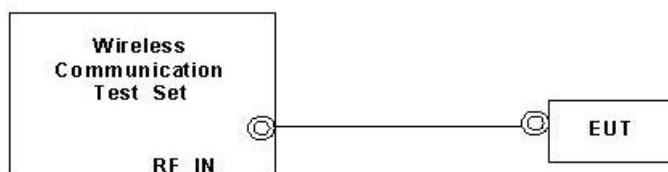
### **Conducted Output Power:**

The EUT was tested according to the requirements of the FCC 3G procedures and the TS 34.121. The EUT's WCDMA and HSPA function is Release 6 version supporting HSDPA Category 8, and HSUPA Category 5. A detailed analysis of the output power for all WCDMA, HSPDA, and HSPA (HSUPA & HSDPA) modes is provided in the tables below. According to the FCC 3G procedures, handsets with both HSDPA and HSUPA should be tested according to Release 6 HSPA test procedures, and the EUT does not support VOIP function over the HSPA function. Device was tested according to procedure KDB941225 - section Release 6 HSPA Data Devices as documented/evaluated in the following table.

<b>WCDMA SAR Test mode - Conducted Power</b>							
<b>Mode</b>	<b>Setup</b>	<b>Cell band (850)</b>			<b>PCS band (1900)</b>		
		<b>CH4132</b>	<b>CH4182</b>	<b>CH4233</b>	<b>CH9262</b>	<b>CH9400</b>	<b>CH9538</b>
		<b>826.4 (MHz)</b>	<b>836.4 (MHz)</b>	<b>846.6 (MHz)</b>	<b>1852.4 (MHz)</b>	<b>1880.0 (MHz)</b>	<b>1907.6 (MHz)</b>
<b>WCDMA</b>	<b>RMC 12.2Kbps</b>	24.02	24.17	24.02	23.95	24.06	23.44
<b>HSDPA</b>	<b>Subtest 1</b>	24.02	23.95	23.90	23.82	24.01	23.34
	<b>Subtest 2</b>	23.84	23.68	23.69	23.64	23.95	23.10
	<b>Subtest 3</b>	23.14	23.18	23.10	23.31	23.51	22.65
	<b>Subtest 4</b>	22.87	23.21	23.14	23.24	23.43	22.53
<b>HSUPA</b>	<b>Subtest 1</b>	23.61	22.94	23.58	23.20	23.49	22.58
	<b>Subtest 2</b>	21.98	22.07	21.59	22.25	22.57	21.69
	<b>Subtest 3</b>	22.38	22.20	22.15	22.65	22.63	21.89
	<b>Subtest 4</b>	22.24	22.10	22.19	22.23	22.45	21.82
	<b>Subtest 5</b>	23.10	23.62	23.22	23.13	23.62	22.71

**WCDMA Setup Configuration:**

- a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting
  - i. Data rates: Varied from RMC 12.2Kbps
  - ii. RMC Test Loop = Loop Mode 1
  - iii. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

**Setup Configuration**

**HSDPA Setup Configuration:**

- a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
  - i. Set Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters were set according to each
  - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
  - iii. Set RMC12.2Kbps + HSDPA mode.
  - iv. Set Cell Power = -86 dBm
  - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
  - vi. Select HSDPA Uplink Parameters
  - vii. Set DeltaACK, DeltaNACK and DeltaCQI = 8
  - viii. Set Ack-Nack Repetition Factor to 3
  - ix. Set CQI Feedback Cycle (k) to 4 ms
  - x. Set CQI Repetition Factor to 2
  - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

**Table C.10.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}$ (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ .

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA,  $\Delta_{ACK}$  and  $\Delta_{NACK} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ , and  $\Delta_{CQI} = 24/15$  with  $\beta_{hs} = 24/15 * \beta_c$ .

Note 3: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{hs}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the  $\beta_c/\beta_d$  ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 11/15$  and  $\beta_d = 15/15$ .

**Setup Configuration**

**HSPA (HSUPA & HSPDA) Setup Configuration:**

- a. The EUT was connected to Base Station referred to the drawing of Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting \* :
  - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
  - ii. Set the Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
  - iii. Set Cell Power = -86 dBm
  - iv. Set Channel Type = 12.2k + HSPA
  - v. Set UE Target Power
  - vi. Power Ctrl Mode= Alternating bits
  - vii. Set and observe the E-TFCI
  - viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

**Table C.11.1.3:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note 1)	$\beta_{ec}$	$\beta_{ed}$ (Note 5) (Note 6)	$\beta_{ed}$ (SF)	$\beta_{ed}$ (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ .

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{hs}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the  $\beta_c/\beta_d$  ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 10/15$  and  $\beta_d = 15/15$ .

Note 4: For subtest 5 the  $\beta_c/\beta_d$  ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 14/15$  and  $\beta_d = 15/15$ .

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6:  $\beta_{ed}$  can not be set directly, it is set by Absolute Grant Value.

**Setup Configuration**

**Note:** For details settings in the Agilent 8960 test equipment, please refer to the user guide "HSUPA Measurement Guide with 8960 V7.5.0 Release 7 (2007-06) Ver.: v.02.18"

Call Setup Screen									
Call Control		Active Cell Operating Mode						Call Parms	
Channel (UARFCN) Info		<div>UE Information</div> <div>           INSI:            INEI:            Power Class:         </div>						<div>Cell Power</div> <div>-86.00</div>	
Cell Parameters								<div>dBm/3.84 MHz</div>	
Generator Info		<div>UE Expected Open Loop Transmit Power</div> <div>           Initial PRACH TX Power: -11.70 dBm            Initial DPCH TX Power: -0.56 dBm         </div>						<div>Channel Type</div> <div>12.2k + HSPA</div>	
Uplink Parameters		<div>Uplink Parameters</div> <div>           PRACH Preambles: 64            PRACH Ramping Cycles(MAX): 2            Available Subchannels (Bit Mask): 000000000001            Uplink DPCH Scrambling Code: 0            Uplink DPCH Bc/Bd Control: Manual            Manual Uplink DPCH Bc: 11            Manual Uplink DPCH Bd: 15            Maximum Uplink Transmit Power Level: 21 dBm         </div>						<div>Paging Service</div> <div>RB Test Mode</div>	
UE Rep Meas		<div>Value</div> <div>           PRACH Preambles: 64            PRACH Ramping Cycles(MAX): 2            Available Subchannels (Bit Mask): 000000000001            Uplink DPCH Scrambling Code: 0            Uplink DPCH Bc/Bd Control: Manual            Manual Uplink DPCH Bc: 11            Manual Uplink DPCH Bd: 15            Maximum Uplink Transmit Power Level: 21 dBm         </div>						<div>HSPA Parameters</div>	
Close Menu		<div>Active Cell</div> <div>Idle</div>						<div>34.121 Preset Call Configs</div>	
2 of 4		<div>Sys Type: UTRA FDD</div> <div>IntRef Offset</div>						<div>Channel (UARFCN) Parms</div>	
								1 of 3	

Example for HSPA Subtest 1, and other subtests following table, C11.1.3  
(Gain Factors ( $\beta_c = 11$  and  $\beta_d = 15$ ))

Call Setup Screen									
Call Control		Active Cell Operating Mode						Serving Grant	
Additional Screens		<div>UE Information</div> <div>           INSI:            INEI:            Power Class:         </div>						<div>AG Mode</div> <div>Single Shot</div>	
Cell Parameters		<div>UE Expected Open Loop Transmit Power</div> <div>           Initial PRACH TX Power: -11.70 dBm            Initial DPCH TX Power: -0.56 dBm         </div>						<div>Single Shot AG</div> <div>20: (119/15)^2</div>	
Generator Info		<div>Call Processing Status</div> <div>           Current Service Type: None            MM Status: Abs Single Shot AG            GMM State: Index 15: (67/15)^2            Current DPCH: Index 16: (75/15)^2            HSUPA In: Index 17: (84/15)^2            UE Rep E-DCH: Index 18: (95/15)^2            Last Received: Index 19: (106/15)^2            Throughput: Index 20: (119/15)^2            ACKs Transmitted:         </div>						<div>Send Single Shot Absolute Grant</div>	
Uplink Parameters		<div>Information</div> <div>           OSCH Cat: ----            Ratio: ---- %            kbps            Transmitted: ----         </div>						<div>Send Relative Grant Up</div>	
UE Rep Meas		<div>Active Cell</div> <div>Idle</div>						<div>Send Relative Grant Down</div>	
Trig Output Setup		<div>Sys Type: UTRA FDD</div> <div>IntRef Offset</div>						<div>Return</div>	
Sys Frame Clock								1 of 2	
2 of 4									

Example: AG – Index = 20 for HSPA subtest 1



Call Setup Screen																																																																																																													
Screen Ctrl	Recorded E-TFCI Information							E-TFCI Record																																																																																																					
Channel (UARFCN) Info	<div>E-TFCI Recording State</div> <div>Idle</div>							E-TFCI Rec Count																																																																																																					
								15																																																																																																					
HSPA Information	<div>Recorded E-TFCI Values</div> <table border="1"> <tr><td>1:</td><td>75</td><td>11:</td><td>75</td><td>21:</td><td>----</td><td>31:</td><td>----</td><td>41:</td><td>----</td></tr> <tr><td>2:</td><td>75</td><td>12:</td><td>75</td><td>22:</td><td>----</td><td>32:</td><td>----</td><td>42:</td><td>----</td></tr> <tr><td>3:</td><td>75</td><td>13:</td><td>75</td><td>23:</td><td>----</td><td>33:</td><td>----</td><td>43:</td><td>----</td></tr> <tr><td>4:</td><td>75</td><td>14:</td><td>75</td><td>24:</td><td>----</td><td>34:</td><td>----</td><td>44:</td><td>----</td></tr> <tr><td>5:</td><td>75</td><td>15:</td><td>75</td><td>25:</td><td>----</td><td>35:</td><td>----</td><td>45:</td><td>----</td></tr> <tr><td>6:</td><td>75</td><td>16:</td><td>----</td><td>26:</td><td>----</td><td>36:</td><td>----</td><td>46:</td><td>----</td></tr> <tr><td>7:</td><td>75</td><td>17:</td><td>----</td><td>27:</td><td>----</td><td>37:</td><td>----</td><td>47:</td><td>----</td></tr> <tr><td>8:</td><td>75</td><td>18:</td><td>----</td><td>28:</td><td>----</td><td>38:</td><td>----</td><td>48:</td><td>----</td></tr> <tr><td>9:</td><td>75</td><td>19:</td><td>----</td><td>29:</td><td>----</td><td>39:</td><td>----</td><td>49:</td><td>----</td></tr> <tr><td>10:</td><td>75</td><td>20:</td><td>----</td><td>30:</td><td>----</td><td>40:</td><td>----</td><td>50:</td><td>----</td></tr> </table>							1:	75	11:	75	21:	----	31:	----	41:	----	2:	75	12:	75	22:	----	32:	----	42:	----	3:	75	13:	75	23:	----	33:	----	43:	----	4:	75	14:	75	24:	----	34:	----	44:	----	5:	75	15:	75	25:	----	35:	----	45:	----	6:	75	16:	----	26:	----	36:	----	46:	----	7:	75	17:	----	27:	----	37:	----	47:	----	8:	75	18:	----	28:	----	38:	----	48:	----	9:	75	19:	----	29:	----	39:	----	49:	----	10:	75	20:	----	30:	----	40:	----	50:	----	Start Recording E-TFCI Values	
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Example: Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1



**Reference:**

- [1] 941225 D01 SAR test for 3G devices v02, SAR Measurement Procedures for 3G Devices CDMA 2000/Ev-Do/WCDMA/HSDPA/HSPA Oct. 2007 Laboratory Division Office of Engineering and Technology Federal Communications Commission
- [2.] TS 34.121 Universal Mobile Telecommunications System (UMTS); Terminal Conformance Specification, Radio Transmission and Reception (FDD)
- [3.] HSUPA Measurement Guide with 8960 V7.5.0 Release 7 (2007-06) Ver.: v.02.18